

IN THE CLAIMS:

Please amend the claims as follows:

1. (Previously Presented) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem; and

recording changes to said zombie filesystem in a persistent memory.

2. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and

for a deletion operation on a file in said live filesystem: (a) transferring said file from said live filesystem to said zombie filesystem; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while said file is associated with said zombie filesystem, wherein

said recording of changes includes recording said breaking of links ~~in a plurality of steps~~; and (c) altering said live filesystem to reflect said deletion operation.

3. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and

for a truncation operation on a file in said live filesystem: (a) transferring at least a portion of said file from said live filesystem to said zombie filesystem; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while a portion of said file is associated with said zombie filesystem, wherein said recording of changes includes recording said breaking of links ~~in a plurality of steps~~; and (c) altering said live filesystem to reflect changes associated with said breaking of links.

4. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and
for an operation apparent to users as ~~substantially~~ atomic, performing said operation ~~in a plurality of steps~~ using said zombie filesystem, wherein said recording changes is performed in said persistent memory for each of said plurality of steps.

5. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and
for an operation performed on a file having attached data elements, performing said operation using said zombie file-space.

6. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and

for an operation performed using said zombie filesystem, altering a size of said zombie filesystem during performance of said operation.

7. (Original) A method as in claim 1, including, for an operation performed using said zombie filesystem, checkpointing said filesystem during performance of said operation.

8. (Currently Amended) A method as in claim 1, including recording changes to said live filesystem in said persistent memory, wherein records of changes to said live filesystem and of changes to said zombie filesystem are ~~substantially~~ interspersed.

9. (Original) A method as in claim 1, including replaying a set of said changes in response to said record.

10. (Currently Amended) A method as in claim 1, including replaying a set of said changes to said live filesystem and to said zombie filesystem, wherein replay of changes includes ~~substantial~~ interspersed performance of changes to said live filesystem and to said zombie filesystem.

11. (Original) A method as in claim 1, including replaying a set of said changes in said record in response to a crash recovery by said filesystem.

12. (Currently Amended) A method as in claim 1, wherein said persistent memory includes a log of ~~substantially~~ all changes, within a selected time duration, to either said live filesystem or said zombie filesystem.

13. (Currently Amended) A method as in claim 1, wherein said persistent memory includes a log of ~~substantially~~ all changes, within a selected time duration, to said zombie filesystem.

14. (Currently Amended) A method as in claim 1, wherein said recorded changes include a set of ~~substantially~~ atomic operations to said zombie filesystem.

15. (Previously Presented) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem; and

dynamically growing said zombie filesystem.

16. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem;

recording changes to said zombie filesystem in a persistent memory; and

for a deletion or truncation operation on a file in said live filesystem: (a) allocating storage within said zombie filesystem for metadata associated with said file; (b) performing said dynamic growth in response to failure of said allocation of storage; (c) re-performing said allocation of storage after said dynamic growth; and (d) transferring said file from said live filesystem to said zombie filesystem.

17. (Original) A method as in claim 15, wherein said dynamic growth occurs, for an operation performed using said zombie filesystem, during performance of said operation.

18. (Previously Presented) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file from said live filesystem to said zombie filesystem before breakage of links to blocks in said file, in response to an operation on said file, said operation using said zombie filesystem.

19. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file to said zombie filesystem before breakage of links to blocks in said file, in response to an operation on said file, said operation using said zombie filesystem;

wherein, for a deletion operation on a file in said live filesystem, said transfer includes (a) creating a link associating said file with said zombie filesystem, [[:]] and (b) breaking a link associating said file with said live filesystem; and said deletion operation includes (a) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while said file is associated with said zombie filesystem, [[:]] (b) recording said breaking of links ~~in a plurality of steps~~, and (c) altering said live filesystem to reflect said deletion operation.

20. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file to said zombie filesystem before breakage of links to blocks in said file, in response to an operation on said file, said operation using said zombie filesystem;

wherein, for a truncation operation on a file in said live filesystem, said transfer includes (a) creating a link associating at least a portion of said file with said zombie filesystem, [[:]] and (b) breaking a link associating said portion with said file in said live filesystem; and said truncation operation includes (a) breaking links associating disk blocks with said file ~~in a~~

~~plurality of steps~~ while a portion of said file is associated with said zombie filesystem, wherein said recording of changes includes recording said breaking of links ~~in a plurality of steps,~~ and (b) altering said live filesystem to reflect changes associated with said breaking of links.

21. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file from said live filesystem to said zombie filesystem before performing any ~~substantial~~ portion of an operation on said file, said operation using said zombie filesystem.

22. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file to said zombie filesystem before performing any ~~substantial~~ portion of an operation on said file, said operation using said zombie filesystem;

wherein, for a deletion operation on a file in said live filesystem, said transfer includes (a) creating a link associating said file with said zombie filesystem, ~~[[;]]~~ and (b) breaking a link associating said file with said live filesystem; and said deletion operation includes (a) breaking links associating disk blocks with said file ~~in a plurality of steps~~ only while said file is

associated with said zombie filesystem, ~~[[;]]~~ (b) recording said breaking of links ~~in a plurality of steps;~~ and (c) altering said live filesystem to reflect said deletion operation.

23. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

transfer of a file to said zombie filesystem before performing any ~~substantial~~ portion of an operation on said file, said operation using said zombie filesystem;

wherein, for a truncation operation on a file in said live filesystem, said transfer includes (a) creating a link associating at least a portion of said file with said zombie filesystem, ~~[[;]]~~ and (b) breaking a link associating said portion with said file in said live filesystem; and said truncation operation includes (a) breaking links associating disk blocks with said file ~~in a plurality of steps~~ only while a portion of said file is associated with said zombie filesystem, ~~[[;]]~~ (b) recording said breaking of links ~~in a plurality of steps;~~ and (c) altering said live filesystem to reflect changes associated with said breaking of links.

24. (Previously Presented) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem; and

replay of an operation on said file, said operation using said zombie filesystem.

25. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

replay of an operation on a file, said operation using said zombie filesystem;

wherein said replay is responsive to a set of recorded changes in a persistent memory;

and including, for a deletion operation on a file in said live filesystem, (a) transferring said file from said live filesystem to said zombie filesystem, and recording said transfer in said persistent memory; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while said file is associated with said zombie filesystem, and recording said breaking of links in said persistent memory ~~in a plurality of steps~~; and (c) altering said live filesystem to reflect said deletion operation, and recording said alteration in said persistent memory.

26. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

replay of an operation on a file, said operation using said zombie filesystem;

wherein said replay is responsive to a set of recorded changes in a persistent memory;

and including, for a truncation operation on a file in said live filesystem, (a) transferring at least a portion of said file from said live filesystem to said zombie filesystem, and recording said transfer in said persistent memory; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while a portion of said file is associated with said zombie filesystem, and recording said breaking of links in said persistent memory ~~in a plurality of steps~~; and (c) altering said live filesystem to reflect changes associated with said breaking of links, and recording said alteration in said persistent memory.

27. (Previously Presented) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

moving at least some blocks of a file from said live filesystem to said zombie filesystem; and

replay of a set of filesystem operations, said operations including at least some operations using said live filesystem and at least some operations using said zombie filesystem.

28. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

replay of a set of filesystem operations, said operations including at least some operations using said live filesystem and at least some operations using said zombie filesystem;

wherein said replay is responsive to a set of recorded changes in a persistent memory;

and including, for a deletion operation on a file in said live filesystem, (a) transferring said file from said live filesystem to said zombie filesystem, and recording said transfer in said persistent memory; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while said file is associated with said zombie filesystem, and recording said breaking of links in said persistent memory ~~in a plurality of steps~~; and (c) altering said live filesystem to reflect said deletion operation, and recording said alteration in said persistent memory.

29. (Currently Amended) A method of operating a filesystem, said filesystem including a live filesystem accessible to users and a zombie filesystem not accessible to users, said method including

replay of a set of filesystem operations, said operations including at least some operations using said live filesystem and at least some operations using said zombie filesystem;

wherein said replay is responsive to a set of recorded changes in a persistent memory;

and including, for a truncation operation on a file in said live filesystem, (a) transferring at least a portion of said file from said live filesystem to said zombie filesystem, and recording said transfer in said persistent memory; (b) breaking links associating disk blocks with said file ~~in a plurality of steps~~ while a portion of said file is associated with said zombie filesystem, and recording said breaking of links in said persistent memory ~~in a plurality of steps~~;

and (c) altering said live filespace to reflect changes associated with said breaking of links, and recording said alteration in said persistent memory.